Sustainable flood alleviation in the Stroud Valleys: an investigation into a multi-benefit, community-led approach to water management

Adam Broadhead
Supervisor: Dr Tim Hess

Cranfield UNIVERSITY

Project in collaboration with:

WATER21
info@water21.org.uk
www.water21.org.uk

Environment Agency
rhys.mccarthy@environment-agency.gov.uk
neil.scrivens@environment-agency.gov.uk

1. Introduction

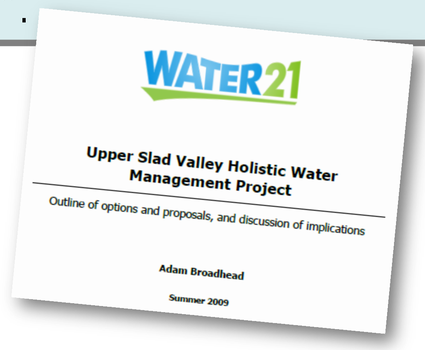
To tackle regular flooding from the Slad Brook, Stroud, the Environment Agency (EA) has proposed a Flood Alleviation Scheme of two seasonal reservoirs costing c. £500k.

This study builds on work by **Water21** in direct response to:
-EA requests for alternative or supportive options to manage flooding, biodiversity and climate change resilience.
-Community and landowner requests to provide flood storage in turn for additional "**multi-benefits**".

Left: flooding in Stroud 2007. Photo by Zara Davis.

Right: previous research in Slad underpins this study.

Bottom right: Hazel Mill leat. Photo by Water21.



2.1 The hypothesis

-Sustainable flood management achievable by identifying "multi-benefit" solutions
-Best resolved at the community level

2.2 Aims to provide

1. Specific solutions for Slad
2. Wider catchment participation
3. New approach to flood & water management

3. Methodology - option appraisal

EA Slad Flood Workshop identified options to assess for:
-Flood control – impact on runoff hydrograph
-Multi-benefits – semi-quantitative appraisal framework

4.1 Investigating land management measures: Adapting and developing CFMP Tool for Slad

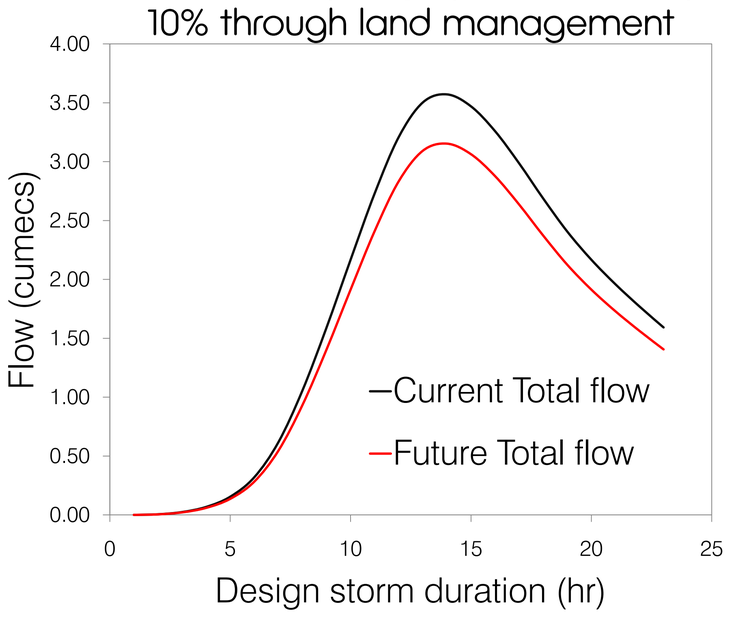
Improve soil quality
Runoff control measures
Create wet woodland

→ Flood control ✓
Multi-benefits:
-Erosion control ✓
-Better agriculture ✓

→ Identifying achievable beneficial solutions

→ 10% reduction in catchment runoff for Q75 event modelled using CFMP Tool and ReFH

Q75 flood hydrograph reduced by 10% through land management



4.2 Restoring historic mills to store floodwater: Surveying to assess hydropower potential

Hazel Mill case study
Existing infrastructure
Engaged landowner
Min. 5kW scheme

→ Hydrograph moderation ✓
Multi-benefits:
-Viable small-scale hydro ✓
-Silt capture and retrieval ✓

5. Five key findings

1. Land management measures can reduce runoff by 10-15% – providing Climate Change resilience to EA scheme
2. Restoring historic mills can have cumulative contribution to flood storage – whilst giving viable renewable energy
3. The community-led approach has fostered good relations – new multi-benefit opportunities opened up
4. Multi-benefit approaches encourage participation – by providing flood storage in return for water resources
5. But: Flood storage capacity required by EA not yet met by these measures – many more landowners are required

The benefits of individual "win-win" cases should not be underestimated

www.cranfield.ac.uk/sas/wm

School of Applied Sciences, Cranfield University, Cranfield, Bedfordshire. MK43 0AL
Contact: a.t.broadhead@cranfield.ac.uk Supervisor: t.hess@cranfield.ac.uk